MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2016/2017

ECP1016 – COMPUTER AND PROGRAM DESIGN

10 OCTOBER 2016
9:00 a.m. – 11:00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENT

1. This Question paper consists of 5 pages including cover page with 5 Questions only.
2. Answer **ALL FIVE** questions. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please write all your answers in the Answer Booklet provided.

Question 1

(a) What is the output of the following program?

```
#include <stdio.h>
int main ( ) {
    int i = 555;
    float f = 456.12378;
    char s[ ] = "Bon Voyage";
    printf("%.5d\n", i);
    printf("%.3f\n %.3e\n %.3g\n", f, f, f);
    printf("%.7s\n",s);
    return 0;       }
```

[5 marks]

(b) Write an appropriate C program segment that determines and prints if `n1` is a multiple of `n2`. Both numbers contain integer values.

[5 marks]

(c) Multiplication of two numbers can be performed equivalently by repetitive addition operations. For example, 5 × 3 = 5 + 5 + 5 (adding 5 repeatedly for 3 times) = 15.

The algorithm shown in Figure Q1.1(a) inputs two integer values from user, and displays the result of multiplication of the two values. Note that `num1`, `num2` and `result` are declared to store the two values and the result of the calculation, respectively; and `k2` is a counter. Figure Q1.1(b) shows a sample program output (texts in bold are user inputs).

```
prompt user for num1 and num2
input num1 and num2

set result to 0
set k2 to 1
while k2 is less than or equal to num2
   add num1 to result
   increment k2 by 1

print multiplication result
```

Figure Q1.1(a)

```
Enter two integers: 5 3
5 * 3 = 15
```

Figure Q1.1(b)

Convert the pseudocode given in Figure Q1.1(a) to C code.

[10 marks]

Continued...

Question 2

(a) Write a complete C program that prompts user for 10 integer values and stores the values into an array. Upon receiving each data, the program checks for negative value, and set negative value to 0. The program finally displays the final contents of the array. A sample program output is given in Figure Q2.1 (texts in bold are user inputs).

```
Enter 10 integers: 1 2 1 3 -1 -8 2 3 1 3
Final contents: 1 2 1 3 0 0 2 3 1 3
```

Figure Q2.1

[10 marks]

(b) Write the formatted output of the code given in Figure Q2.2.

```
#include <stdio.h>

int main(){
  float x=0, y[]={1.15,2.22,3.3}, *xptr = &x, *yptr = y;

  *xptr = 2.5;

  printf("x: %.2f\n", x);
  printf("*(yptr+1): %.2f\n", *(yptr+1));
  printf("*yptr+2: %.2f\n", *yptr+2);
  return 0;
}
```

Figure Q2.2

[5 marks]

(c) What is a string? Complete the following C program which can be used to reverse a given string.

```
#include<stdio.h>
#include<string.h>
int main() {
 //declaring variables
 char string[100], rev_string[100];  int i, j=0, len;
 //inputting the string
 printf("Enter a string: ");   scanf("%s", string);
 //finding the length of the string
```

```

```

```
 //reversing the string
```

```

```

```
//making the rev_string null terminated
 rev_string[j] ='\0';
//printing the reversed string
```

```

```

```
 }
```

[5 marks]

Continued...

Question 3

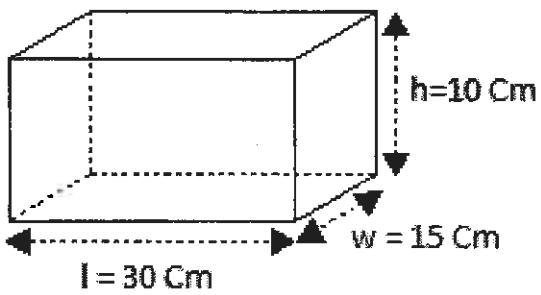
(a) What is a function in C language? Write the difference between user-defined (or self-defined) function and library (or in-built) function. Write the in-built function to perform the following tasks.
(i) To find the sine value for 1.57 radian.

(ii) To find the logarithm value of 100.

(iii) To find the length of the string "PROGRAMMING IS AN ART"

[5 marks]

(b) Given below is the formula for calculating the area of a box.
Area of a box = 2 x [(w x l) + (l x h) + (h x w)],
Where l = length, w = width, and h = height.
Design a user defined C function to find the area of any box. Your function should accept the values for width, height and length of the box as input parameters and return the calculated area.
Write a function call to calculate the area of the following box.



Write a main function to calculate the area of a similar box of any dimension.

[10 marks]

(c) There are, in general, two ways to pass arguments to a function, namely call-by-value and call-by-reference. What are the differences between them? Write a call-by-reference function call to the following function swap to inter-change the values of the integer variables X and Y.

//user-defined function to swap two integers.

```
void swap( int *A, int *B)
{       int t;
        t= *A;
        *A = *B;
        *B = t;
}
```

[5 marks]

Continued...

Question 4

(a) What is the need for us to store data in files? Write the two ways of accessing the data stored on files.

[4 marks]

(b) Write a complete C program to perform the following operations.

i. Open a text file, named "*in.txt*" for reading. The program should print error message and stop immediately if error occurs in opening file.

[4 marks]

ii. Count the number of characters in the "*in.txt*" file.

[3 marks]

iii. Create a new text file "*out.txt*" for writing. The program should print error message and stop immediately if error occurs in opening file.

[2 marks]

iv. Transfer the character from the"*in.txt*" file to a character array whose space is allocated dynamically (dynamic memory allocation).

[4 marks]

v. Write the characters from the array into "*out.txt*" with space between each character.

[3 marks]

Question 5

(a) The task is to sum the integers from 1 to a given upper bound. The program should prompt user for an upper bound and compute its sum and average.

i. Develop an algorithm in the form of flowchart to accomplish the above mentioned task.

[7 marks]

ii. Write a complete C program based on the developed algorithm.

[6 marks]

iii. Rewrite the code to receive an option from the user whether to sum only odd integers or even integers from 1 to the given upper bound. Design the program in such a way that it should ask the user to enter the option again if it is wrongly entered.

[7 marks]

End of Page